BD-RE (Blu-ray Rewritable)

FIG. 1

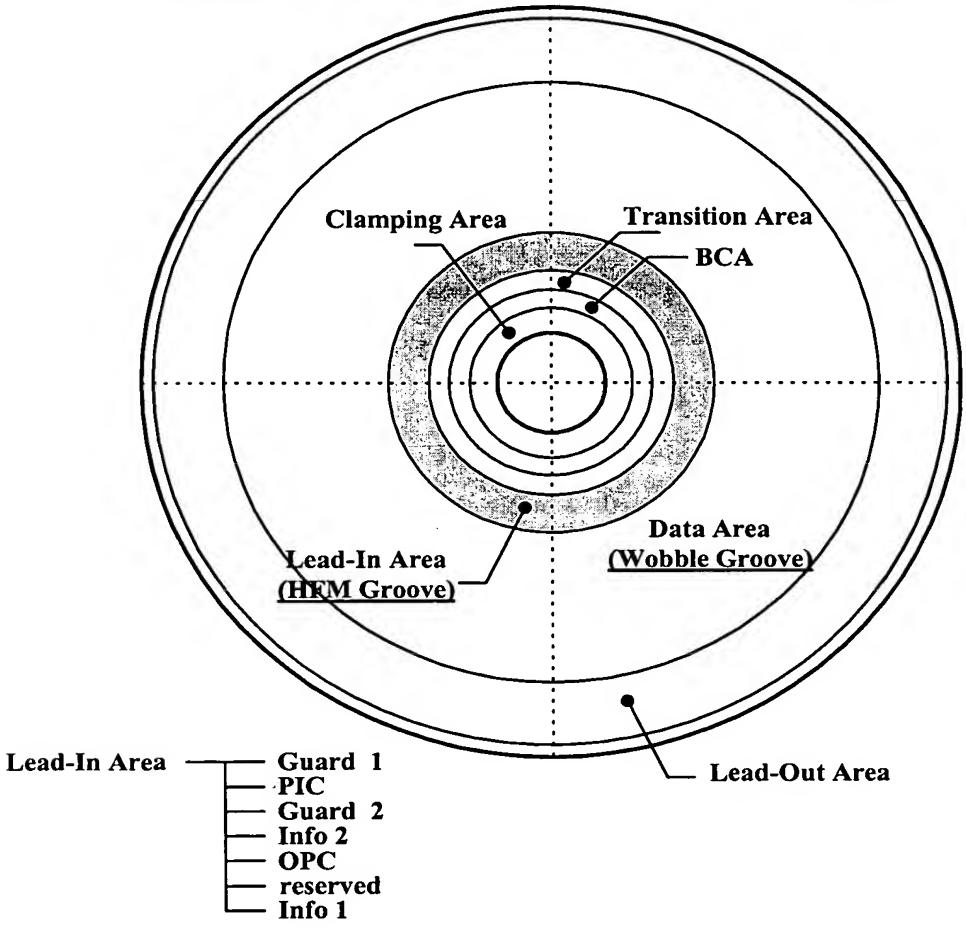
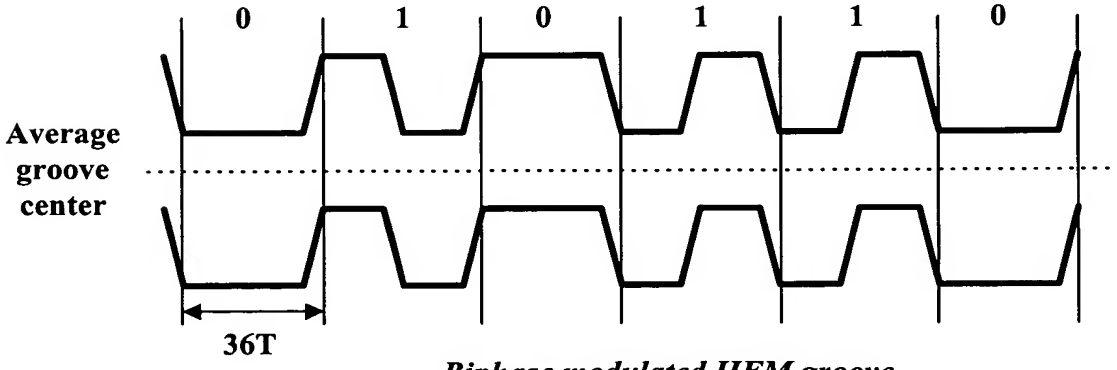


FIG. 2



Biphase modulated HFM groove

FIG. 3

BD-ROM (Blu-ray ROM)

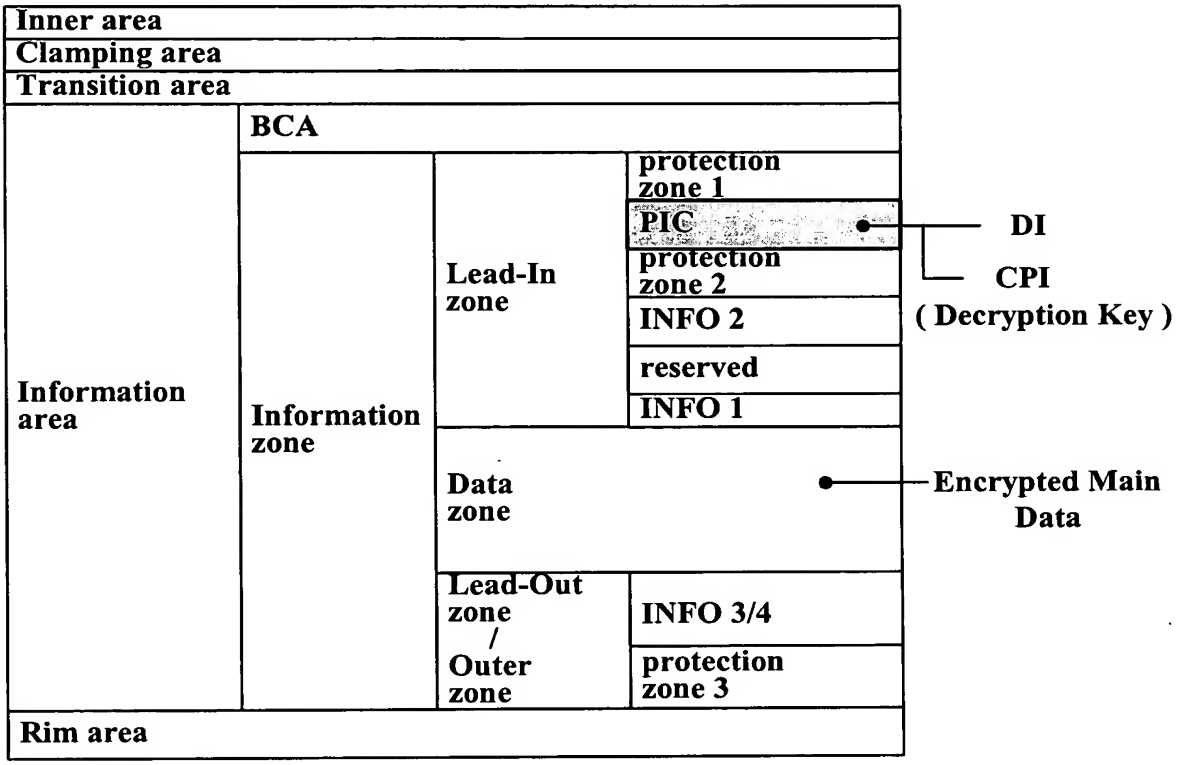


FIG. 4

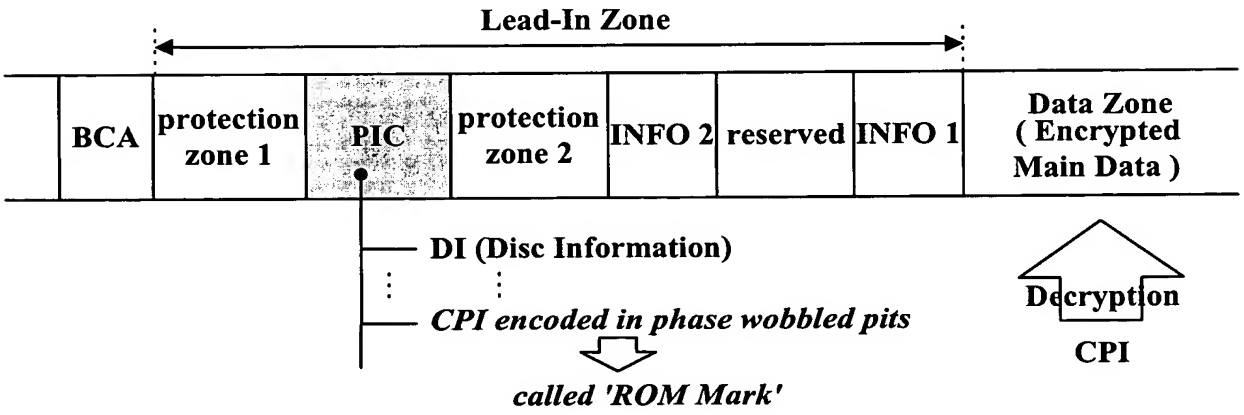


FIG. 5

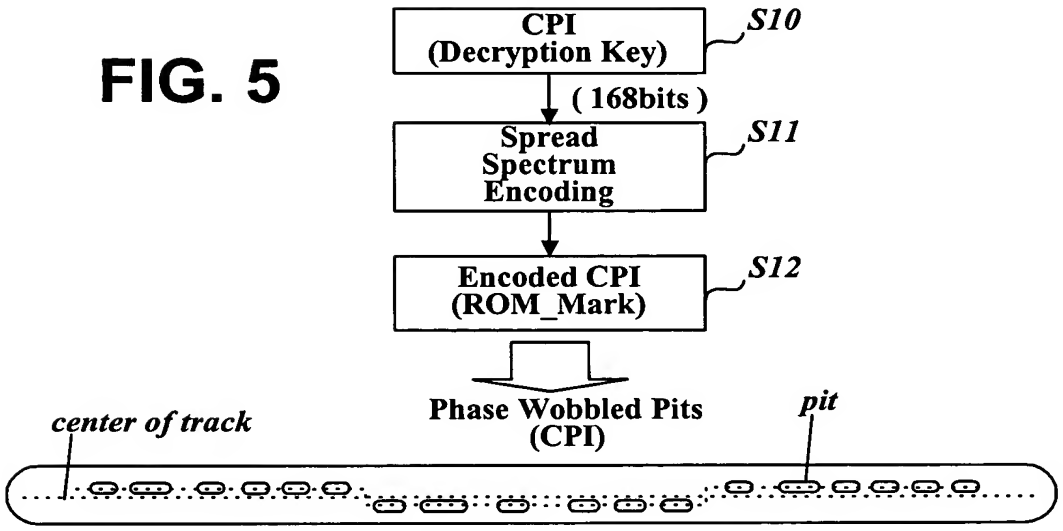

CPI
(Decryption Key)
S10
(168bits)
Spread
Spectrum
Encoding
S11
Encoded CPI
(ROM_Mark)
S12
Phase Wobbled Pits
(CPI)
center of track
pit

FIG. 6

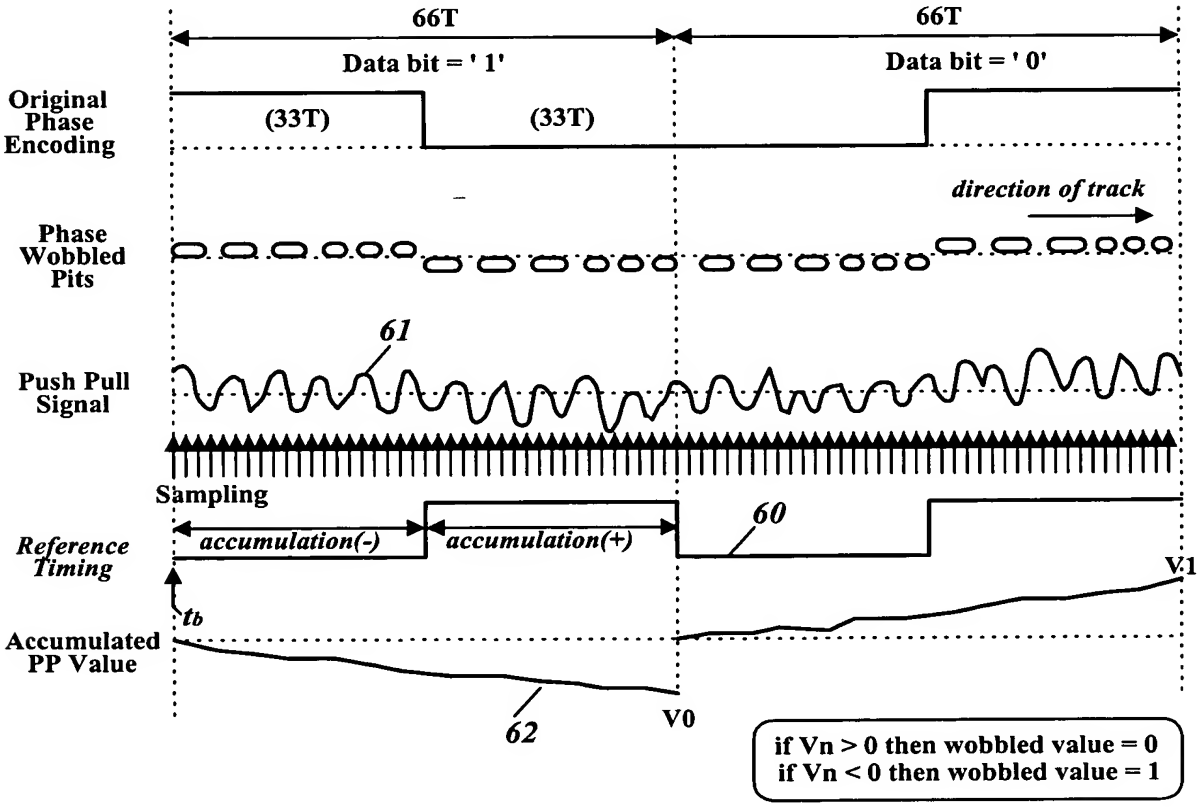

66T
66T
Data bit = ' 1'
Data bit = ' 0'
Original Phase Encoding
(33T)
(33T)
direction of track
Phase Wobbled Pits
61
Push Pull Signal
Sampling
Reference Timing
accumulation(-)
accumulation(+)
60
V1
tb
Accumulated PP Value
62
V0
if Vn > 0 then wobbled value = 0
if Vn < 0 then wobbled value = 1

FIG. 7

Physcial Cluster (64KB)

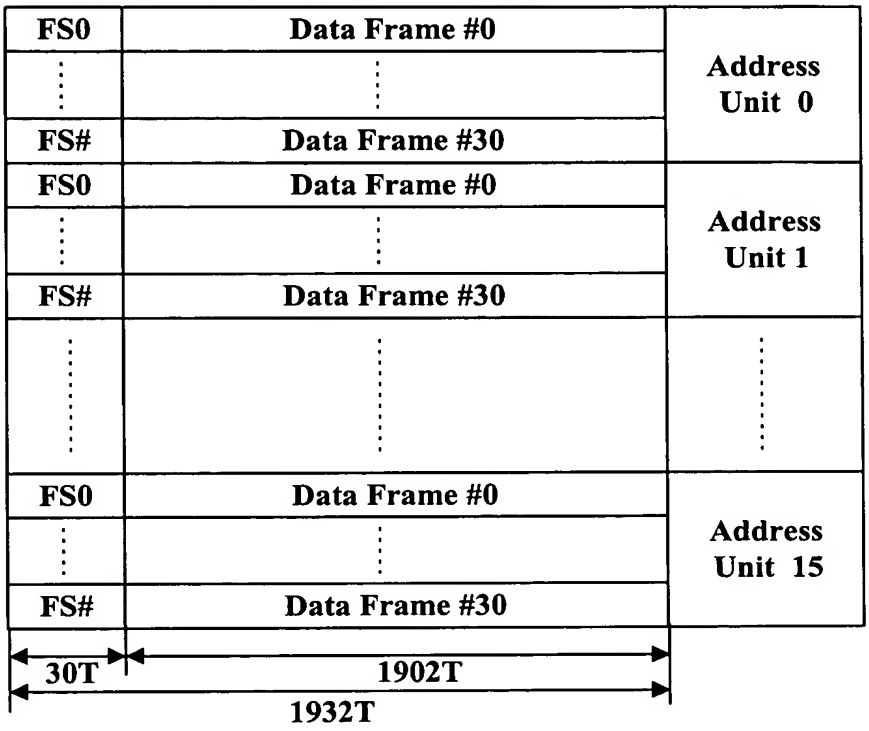


FIG. 8

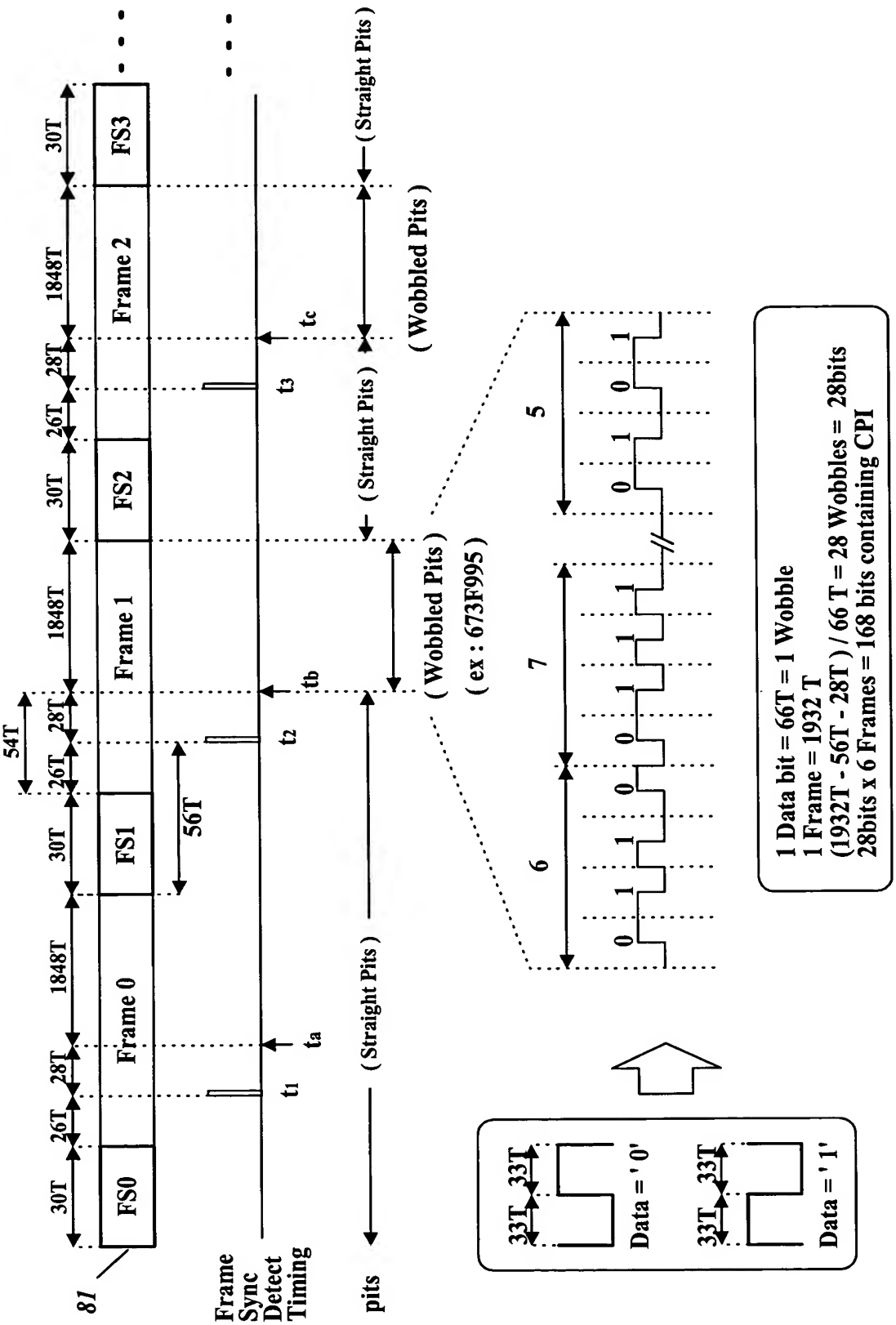

81
FS0
FS1
FS2
FS3
Frame 0
Frame 1
Frame 2
30T
26T
28T
1848T
54T
56T
Frame Sync Detect Timing
pits
ta
tb
tc
t1
t2
t3
(Straight Pits)
(Wobbled Pits)
(ex : 673F995)
33T
Data = ' 0'
Data = ' 1'
1 Data bit = 66T = 1 Wobble
1 Frame = 1932 T
(1932T - 56T - 28T) / 66 T = 28 Wobbles = 28bits
28bits x 6 Frames = 168 bits containing CPI

FIG. 9

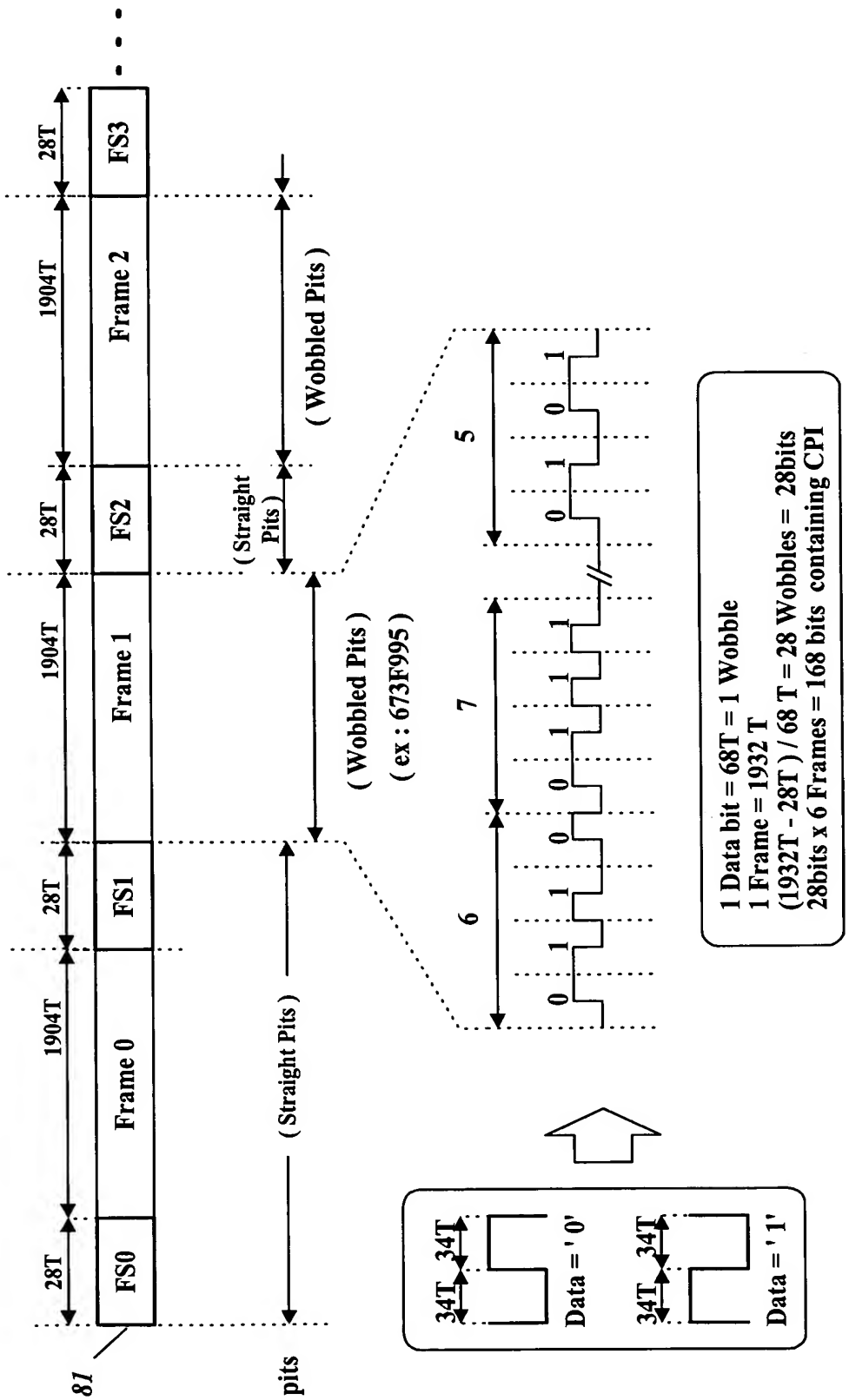

28T
1904T
28T
1904T
28T
1904T
28T
FS0
FS1
FS2
FS3
Frame 0
Frame 1
Frame 2
81
pits
(Straight Pits)
(Wobbled Pits)
(Straight Pits)
(Wobbled Pits)
(ex : 673F995)
6
7
5
0 1 1 0 0 1 1 1
0 1 1 0
34T 34T
Data = ' 0'
34T 34T
Data = ' 1'
1 Data bit = 68T = 1 Wobble
1 Frame = 1932 T
(1932T - 28T) / 68 T = 28 Wobbles = 28bits
28bits x 6 Frames = 168 bits containing CPI

FIG. 10

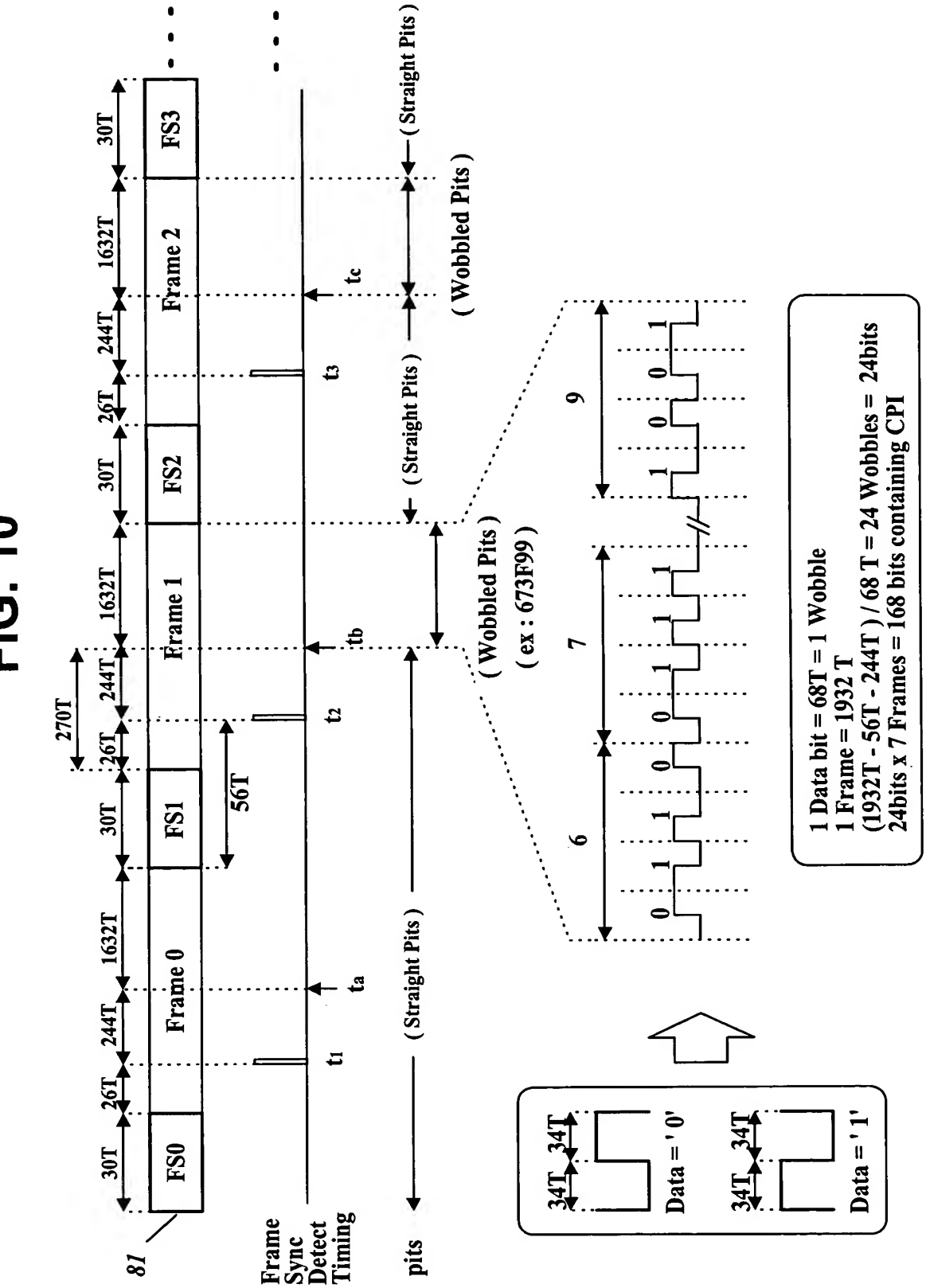
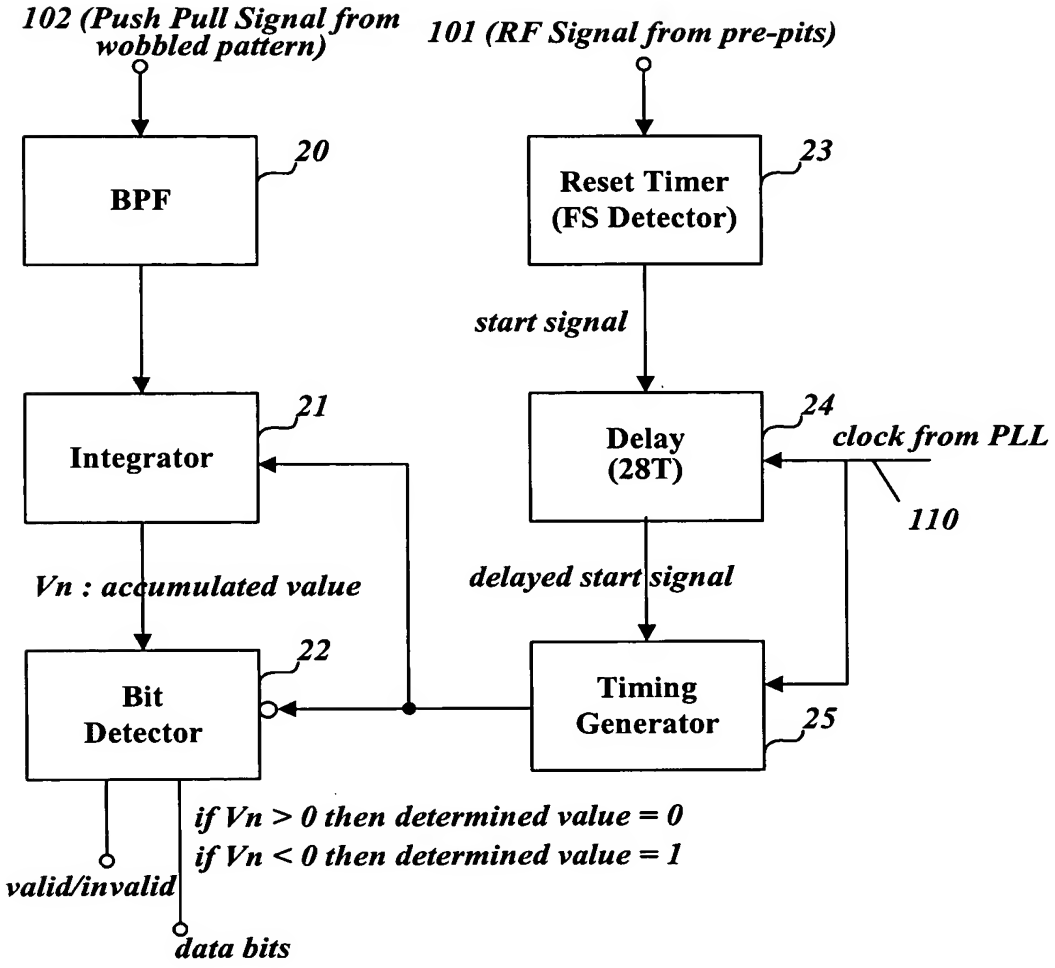

FS0
FS1
FS2
FS3
Frame 0
Frame 1
Frame 2
30T
26T
244T
1632T
270T
56T
81
Frame Sync Detect Timing
pits
t1
t2
t3
ta
tb
tc
(Straight Pits)
(Wobbled Pits)
(ex : 673F99)
Data = ' 0'
Data = ' 1'
34T
1 Data bit = 68T = 1 Wobble
1 Frame = 1932 T
(1932T - 56T - 244T) / 68 T = 24 Wobbles = 24bits
24bits x 7 Frames = 168 bits containing CPI

FIG. 11


102 (Push Pull Signal from wobbled pattern)
101 (RF Signal from pre-pits)
BPF
20
Reset Timer (FS Detector)
23
start signal
Integrator
21
Delay (28T)
24
clock from PLL
110
Vn : accumulated value
delayed start signal
Bit Detector
22
Timing Generator
25
if Vn > 0 then determined value = 0
if Vn < 0 then determined value = 1
valid/invalid
data bits